

**CLAIMS**

I claim:

1. A fuel pump for a combustion engine of a self propelled vehicle, comprising:
  - a tubular motor housing having opposed inlet and outlet ends,
  - a motor in said housing,
  - a pump at said inlet end of said housing, said pump in driven relationship with said motor for moving fuel in a stream from the inlet end of said motor housing, through said motor housing and out of said outlet end of said motor housing,
  - a filter at said inlet end of said motor housing up stream of said pump configured for filtering fuel moving in the stream toward said pump, said filter having a rigid perimeter,
  - a check valve at said inlet end of said motor housing up stream of said filter for reducing the stream of fuel moving through said motor housing to said filter, and
  - a filter detector positioned between said check valve and said filter, said filter detector including a valve engager for extending toward said check valve and urging said check valve toward its open position and a filter engager for engaging said perimeter of said filter,
- whereby in response to a filter being present between said pump and said check valve, said filter detector opens said check valve.

2. The fuel pump of claim 1, wherein said pump is a ring gear pump.

1     3.     A fuel pump for a combustion engine of a self propelled vehicle, comprising:  
2             a housing having a fuel inlet and a fuel outlet,  
3             a pump in said housing for moving fuel in a stream from the fuel inlet and out of  
4     said outlet,  
5             a filter at said inlet of said housing up stream of said pump configured for filtering  
6     fuel moving in the stream toward said pump,  
7             a check valve at said inlet of said housing up stream of said filter for terminating  
8     the stream of fuel moving through said housing to said filter, and  
9             a filter detector positioned between said check valve and said filter, said filter  
10     detector including a valve engager for extending toward said check valve and urging said  
11     check valve toward its open position and a filter engager for engaging said filter,  
12             whereby in response to a filter being present between said pump and said check  
13     valve the filter engager of the filter detector engages the filter and the valve engager of the  
14     filter detector engages and opens the check valve, and in response to a filter not being  
15     present between the pump and the check valve the filter engager of the filter detector does  
16     not engage the filter and the valve engager of the filter detector does not engage and open  
17     the check valve.

1     4.     The fuel pump of claim 3, wherein said filter includes a perimeter, and said filter  
2     engager of said filter detector is configured to engage said perimeter.

1     5.     The fuel pump of claim 4, wherein said filter detector is configured to engage said  
2     perimeter of said filter at more than one position about said perimeter.

1     6.     The fuel pump of claim 5, wherein said housing defines recesses, and said filter  
2     detector includes bearing feet aligned with and movable into said recesses, and said filter  
3     positioned in said housing to block the movement of said bearing feet into said recesses.

1     7.     The fuel pump of claim 6, wherein said housing defines guide recesses, and said  
2     filter detector includes guide pegs movable into said guide recesses for guiding said filter  
3     detector toward said check valve.

1     8.     The fuel pump of claim 3, wherein said filter detector is H-shaped with a fuel  
2     passage formed in the cross bar of the H-shape.

1     9.     The fuel pump of claim 3, wherein said filter detector is H-shaped, and said valve  
2     engager of said filter detector includes a valve stem carried by the cross bar of said H-  
3     shape.

1     10.    The fuel pump of claim 3, wherein said housing includes an elongated  
2     intermediate housing having opposed ends, an inlet end cap mounted to one end of said  
3     housing and an outlet end cap mounted to the other end of said housing, said fuel inlet  
4     extending radially through said inlet end cap, and said inlet end cap and said intermediate  
5     housing being configured for mounting said inlet end cap at intervals of rotation about  
6     said intermediate housing for orienting said inlet at selected positions about said housing.

1 11. The fuel pump of claim 3, wherein said housing includes an elongated  
2 intermediate housing having opposed ends, an inlet end cap mounted to one end of said  
3 housing and an outlet end cap mounted to the other end of said housing, said fuel outlet  
4 extending radially through said outlet end cap, and said outlet end cap and said  
5 intermediate housing being configured for mounting said outlet end cap at intervals of  
6 rotation about said intermediate housing for orienting said fuel outlet at selected positions  
7 about said housing.

1 12. The fuel pump of claim 3, and further including a motor in said housing for  
2 operating said pump.

1 13. A fuel pump for a combustion engine of a self propelled vehicle, comprising:  
2 a housing,  
3 a fuel pump in said housing,  
4 an inlet end cap mounted to said housing,  
5 a fuel inlet extending through said inlet end cap,  
6 an inlet check valve in said inlet end cap for terminating flow of fuel into said  
7 housing,  
8 a ledge formed on said housing facing said inlet end cap,  
9 a filter positioned between said housing and said inlet end cap and having a  
10 perimeter engaging said ledge, with said inlet cap configured to urge said filter perimeter  
11 against said ledge,

12           a filter detector positioned in said inlet end cap and including a filter engager in  
13   alignment with said perimeter of said filter for engaging said filter perimeter and a valve  
14   engager in alignment with said inlet check valve for engaging said inlet check valve and  
15   opening the flow of fuel through said fuel inlet cap,  
16           whereby in response to a filter being present between the housing and the inlet end  
17   cap the filter engager of the filter detector engages the filter and the valve engager of the  
18   filter detector engages and opens the inlet check valve, and in response to the filter not  
19   being present between the housing and the inlet end cap the filter engager of the filter  
20   detector does not engage the filter and moves away from the inlet check valve and the  
21   filter detector does not open the inlet check valve.

1   14.    The fuel pump of claim 13, wherein  
2           said inlet end cap and said housing are configured for mounting  
3   said inlet end cap at intervals of rotation about said housing.

1  
2   15.    A fuel pump for a combustion engine of a self propelled vehicle, comprising:  
3           a housing,  
4           a fuel pump in said housing,  
5           an inlet end cap mounted to said housing,  
6           a fuel inlet extending through said inlet end cap,  
7           an inlet check valve in said inlet end cap for terminating flow of fuel into said  
8   housing,  
9           a ledge formed on said housing facing said inlet end cap,

10           a filter positioned between said housing and said inlet end cap and  
11   having a perimeter engaging said ledge, with said inlet cap configured to urge said filter  
12   perimeter against said ledge,  
13           a filter detector positioned in said inlet end cap and including a filter engager out  
14   of alignment with said ledge and in alignment with said perimeter of said filter for  
15   engaging said filter perimeter and a valve engager in alignment with said inlet check  
16   valve for engaging said inlet check valve and opening the flow of fuel through said fuel  
17   inlet cap,  
18           whereby in response to a filter being present between housing and said inlet end  
19   cap the filter engager of the filter detector engages the filter and the valve engager of the  
20   filter detector engages and opens the inlet check valve, and in response to the filter not  
21   being present between the housing and the inlet end cap the filter engager of the filter  
22   detector does not engage the filter and moves beyond the ledge of the housing and the  
23   valve engager of the filter detector does not open the inlet check valve.